

***Peribatodes rhomboidaria* (D. & S.)(Lep.: Geometridae): changes in appearance time and polymorphism in north-west Kent**

Barrett (1902. *The Lepidoptera of the British Islands*, VII), writes that this moth "is on the wing in July and August, sometimes at the end of June, and occasionally specimens of a second generation of smaller size are found in September". Plant (1993. *The Larger Moths of the London Area*. LNHS) presents a similar description, but with one significant difference — no indication that these later specimens are of smaller size.

My garden mv light at Dartford has shown that the moth was not common here during the 1970s, annual sightings being restricted to single figures. However, for the 1980s they averaged 40, for the 1990s, 61 and for the five years 2001 to 2005 the figure had risen to 95.

A. A. Allen was the first person, I believe, to comment in this Journal on early June sightings, and this for south-east London. My records confirm this trend; for the first half of June my initial records were for the 12 and 14 June 1989, and over the past fifteen years it has become the norm to encounter the moth in early June. In 2002, the first specimen was noted on 31 May; another appeared on 30 May 2004, while in 2005 the first sighting was a month earlier, on 30 April, followed by further specimens on 20, 25, 26, 27 and 30 May after a spell of arctic weather lasting from 7 to 17 May, during which time the mv light was not in use.

Thus there has been an advance in time of appearance from about 1997, from "July, sometimes late June" to early June, perhaps to be amended shortly to late May. However, there has not been a reciprocal advance in emergence time towards end of season; on the contrary the season has tended to lengthen to include the first half of September, and occasionally specimens are encountered in the Autumn.

Over a period of thirty-six years my garden mv light records show that August sightings of *P. rhomboidaria* have exceeded those of July in a ratio of about 4:1. In only three years August was not the predominant month: in 2004 June produced the most sightings, whereas in 1998 September had produced most, and in 2005 June, August and September all eclipsed July to relegate it to fourth position. In recent years, July sightings have declined relatively causing a trend for July to be removed from second place, its traditional position throughout the second half of the twentieth century, by June or September, or even both, one result of the extended season of appearance. However, it appears that the traditional régime, and the recent changes, do not necessarily apply throughout south-east England as might be expected. Collins (1997. *The Larger Moths of Surrey*) for the 1980s and 1990s has noted that in that county generally, *P. rhomboidaria* flies from June to September with peaks in June and September suggesting a bivoltine régime. For north-west Kent, the profile suggests a single generation for these decades and earlier. Additionally for this period there was an absence of ab. *minor* Fuchs, the first specimen of which was noted on 11 September 2002 in sequence following on from August, and followed by several normal sized specimens, the latest being on 1 October. Further ab. *minor* were note in late august and September in the three following years along with a

larger number of normal sized specimens, suggesting a dimorphic second generation. However, this assessment must now be amended, for a specimen of ab. *minor* was noted on 14 June 2005 (first generation) followed by two others (14 and 18 June 2005). Nevertheless, it would seem that these small specimens are confined mainly to the second generation, and are in the minority and frequently absent.

Although *P. rhomboidaria* now appears to be fully bivoltine in this part of north-west Kent, and perhaps to give occasionally at least a partial second generation in the last decade of the 20th century, no distinct gap has ever appeared between the two supposed broods, although invariably in July sightings have dwindled considerably. The earlier moths are indistinguishable from the later ones by ground colour, markings and size, excepting the occasional ab. *minor* which seems to be mainly restricted to the later sightings. This contrasts with bivoltine species such as *Selenia dentaria* (Fabr.), *S. tetralunaria* (Hufn.) and *Ectropis bistortata* (Goeze) in which the two generations are well separated by several weeks and are characterized by moths different in appearance, including size.

Breeding a species in captivity can be a valuable aid in determining voltinism in which the two supposed generations are not separated from each other, and it is preferable to do this under as near natural conditions as possible. However, *P. rhomboidaria* presents a serious problem in that females are rarely attracted to light. However, in 1980 a female was so obtained and the very young larvae kept indoors in an unheated room went into hibernation until late April, being fed on privet *Ligustrum ovalifolium* and the resulting dozens of moths emerged in July 1984. Quite a number of larvae became casualties on coming out of hibernation. The moths were particularly interesting, comprising roughly equal numbers of ab. *nigra* Adkin and ab. *perfumaria* Newman; of these latter specimens several were considerably darker than the normal slate grey, appearing somewhat intermediate between the two aberrations. Unfortunately no eggs were obtained from this small brood.

On 21 August 2005, after my garden light had attracted almost 1,500 more *rhomboidaria* since 1984, another female arrived, but in very worn condition. A few eggs were obtained from which about a dozen moths were bred in November, all ab. *perfumaria*. The young larvae were kept in plastic containers and fed on privet in an unheated room until almost full grown, when the room was heated by day only. Pupation took place on the paper lining the floor of the containers; no attempt was made to construct a cocoon.

The profile of sightings for 2005 strongly suggests a bivoltine regime with the first generation in May and especially June the stronger, the second showing September having slightly more sightings than August, and several in October. By contrast, of the 160 specimens recorded for 2005, only seven were noted in July, just one more than for October. None of the larvae of this presumably third generation showed inclination to hibernate, in contrast with those in 1983. Several females of this brood laid eggs. The very young larvae exhibited slow growth and no attempt to hibernate was observed. To date, in early April, several moths have emerged, but the bulk of the brood are still larvae.

Thus it appears that a series of exceptionally mild autumns and winters in north-west Kent may have initiated a change in this species from having a univoltine to a bivoltine life cycle, based upon the overwintering larvae no longer going into hibernation. Unfortunately the female obtained on 21 August was probably of a second generation, so good circumstantial evidence has yet to be confirmed regarding the exact nature of the two maxima of incidence divided by a month with continued sparse, scattered sightings. A change in voltinism occurred in *Campaea margaritata* (L.) in northwest Kent in the late twentieth century, but with a distinct hiatus of several weeks and a difference in appearance between the two generations.

The accompanying graphs illustrate the development of bivoltinism in *rhomboidaria* at Dartford from observations of garden mv light records in three five year periods on a tripartite basis. Figure 1 shows the typical univoltine life cycle of the period 1981-1985 characteristic throughout the 20th century until about 1995, the lengthening forwards of the time of appearance of the moth in the period 1991-1995 to include June and the apparent change to a bivoltine regime in 2001-2005, with a significant increase in June records and even some for May, a disproportionate increase in sightings for September and October giving an extended time of appearance for the moth, and the significant incomplete July hiatus.

The predominant form in north-west Kent is ab. *perfumaria* Mewman; not until 1998 did I encounter the typical form in the region, and I have seen several since. In addition there has been an extreme melanic, declining in frequency since the 1960s. This is ab. *nigra* Adkin (= *nigerrima* Moreau). These melanics are black with a yellowish postmedian line originating on the dorsum of the fore wing and proceeding obliquely forward to fade out before reaching the costa, and sometimes a similar sub-basal line. These lines are usually conspicuous on fresh specimens, but are somewhat fugitive and less in evidence on old cabinet ones. Its highest incidence since my garden mv light was first operated in 1969 was 38% in 1981 (n = 44), followed by 25% in 1978 (n = 31) and 23% in 1985 (n = 55). There has been considerable confusion regarding the identity of these extreme melanics in Britain, and it persists to-day. An extreme melanic found on the Continent, but not in Britain, was described by Aigner, originally in Hungarian, as ab. *rebeli* in 1905. The description is clear – black, with a pale wavy sub-terminal line on the fore wing. British specimens do not possess a pale wavy sub-terminal line, but they do have, almost always, the yellowish transverse lines. In the early 1930s, C. B. Williams in his studies into the genetics of the extreme melanics of *P. rhomboidaria* from Britain referred to them as ab. *rebeli* Aigner, and the misappropriation of this name has continued until to-day in Britain. However, in the National (RCK) Collection the specimens are labelled ab. *nigra* Adkin and this is the name used by Chalmers-Hunt (*Butterflies and Moths of Kent, Supl. Ent. Rec. 1960-1981*).

Adkin (*Proc. S. Lond. Nat. Hist. Soc. 1908-9*: 85) exhibited a series of extreme melanics of *P. rhomboidaria* from Norwich and West Kent and commented that in general he was not in favour of the naming of aberrations, but nevertheless considered that the specimens might be called ab. *nigra*. He described them as being

uniformly black, omitting mention of the yellowish striae present on almost, if not all, the specimens. Adkin also omitted to allocate a type specimen and paratypes, and there were no accompanying illustrations of the specimens exhibited.

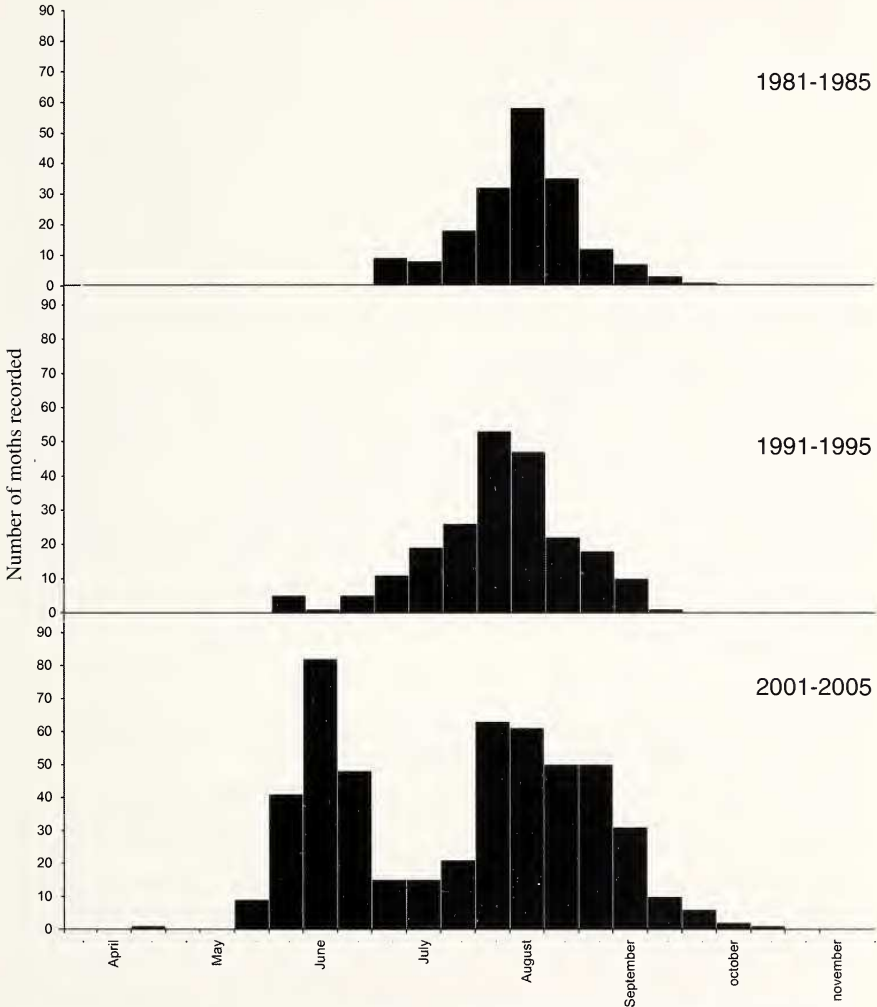


Figure 1. Number of *Peribatodes rhomboidaria* at mv light at Dartford, Kent in five-year periods.

In France, Moreau (1916. *Bull. Soc. Ent. Fr.*: 188 & Plate 1, fl. 4) accurately described and illustrated some French specimens which are identical with the British, which he named ab. *nigerrima*; this appears to be the legitimate name and

should have received universal accord to make Cockayne's intervention unnecessary. However, Cockayne (1953. *Ent. Rec.* **65**: 193) commenting on the continued use in Britain of the name *rebeli* intervened to add legitimacy to Adkin's inaccurate description by allocating one of Adkin's series known to have been exhibited, as a lectotype, a male specimen from Dartford, 12 August 1908. A curious result of the confusion of nomenclature occurs in Seitz in which a figure of *nigra* is labelled *rebeli*, but its accompanying description is based on *nigra*. French textbooks not surprisingly refer to these melanics with their yellowish striae as *nigerrima* Moreau, which I favour, but I consider Adkin's *nigra* is now acceptable, being used by the British Museum (Natural History), presumably as the name predates that of Moreau.

Although Cockayne's intervention may have added some legitimacy to Adkin's *nigra*, the extreme melanics he exhibited in 1908 still remain without adequate description and in fact were somewhat variable. Such variability has been studied and divided into several sub-varieties by Lenek (1951. *Ent. Nachr. blatt* **3**:122). Uniformly black specimens, devoid of markings, are named ab. *orcus* Lenek. Chalmers-Hunt (*op. cit.*) notes several bred specimens from Dartford in 1912, 1913 and 1914 in the National (RCK) Collection. However, despite carefully examining all extreme melanics visiting my garden mv light, only one ab. *orcus* has been identified (13 June 2005), suggesting it is quite rare here. This specimen would appear to be the first wild ab. *orcus* to be recorded for Kent.

Extreme melanic forms of this species in north-west Kent have now declined from 25% for the five years 1981-1985, then already being in decline, to 3.5% for the period 2001-2005, being as low as 1.8% in 2005 (n = 160). However, ab. *perfumaria* remains the prevailing form, and typical *rhomboidaria* remain of casual occurrence.— B. K. WEST, 56 Briar Road, Dartford, Kent DA5 2HN.

Progress in the study of the ecology and management of the Marsh Moth *Athetis pallustris* (Hbn.) (Lep.: Noctuidae) by monitoring of larvae

On 25 September 2005, forty final instar caterpillars of the Marsh Moth *Athetis pallustris* were found at the Saltfleetby-Theddlethorpe Dunes NNR on the Lincolnshire coast. Monitoring of larval populations has taken place here almost annually since 1989, using a technique of making small piles, about one-metre in diameter at the base, of cut grass and any herbage, in the places where the adult moths have been recorded in light-traps. The piles are left on site for two to four weeks and then sifted for larvae over a wire-mesh riddle and white sheet. This is an old technique first found to be successful for the Marsh Moth by Edelsten *et al.* (*Entomologist* **77**: 49-50 & 65-72). Since the early 1990s, monitoring has revealed a major decline in the numbers of larvae found in the litter-piles in the traditional area known for the moth, from as many as 108 in a single visit on 23 September 1989 and about 80 on 29 September 1990, with an average of almost two larvae per litter-pile in 1990, to only one or two larvae per session since 2000, and in some years none seen at all. This has been of great concern because apart from occasional individuals